

REMARKS

I. Introduction

With the addition herein without prejudice of claim 22, claims 1, 4 to 9 and 22 are pending in the present application. In view of the foregoing amendments and the following remarks, it is respectfully submitted that the presently pending claims are allowable, and reconsideration is respectfully requested.

II. Rejection of Claims 1 and 4 to 9 Under 35 U.S.C. § 103(a)

Claims 1 and 4 to 9 were rejected under 35 U.S.C. § 103(a) as unpatentable over a combination of U.S. Patent No. 6,062,461 ("Sparks et al.") and either U.S. Patent No. 6,761,420 ("Maluf et al.") or U.S. Patent No. 6,686, 642 ("Regan et al."), as well as Applicants' alleged discussion of the prior art. It is respectfully submitted that the combination of Sparks et al. and either Maluf et al. or Regan et al., as well as of Applicants' alleged discussion of the prior art, does not render unpatentable the present claims for at least the following reasons.

Claim 1 relates to a microstructured component having a layered construction, comprising: a carrier including at least one glass layer; a component structure including a first silicon layer directly bonded to the glass layer; and a cap arranged over the component structure and bonded directly to the glass layer, wherein the component structure includes a first silicon wafer and is bonded to the glass layer by anodic bonding.

Although the rejection may not be agreed with, to simplify matters, claim 1 has been amended to recite that the component structure is bonded to the glass layer by anodic bonding at a temperature of approximately 400° C. Neither Sparks et al., nor Maluf et al., nor Regan et al., nor Applicants' alleged discussion of the prior art on page 1, lines 18 to 30 of the Specification disclose or suggest that a silicon wafer is anodically bonded directly to a glass layer at a temperature of approximately 400° C. Indeed, it is respectfully submitted that Sparks et al. teach away from the above-mentioned feature of claim 1, as amended. For example, as stated in column 1, lines 46 to 51 of Sparks et al.:

Silicon direct and anodic bonding methods required very smooth bonding surfaces, and therefore cannot produce a vacuum seal when unplanarized metal crossunders are employed, as is often required to electrically interconnect resonating and tunneling micromachines to bond pads outside the vacuum-sealed cavity of a sensor.

In addition, while discussing wafer bonding techniques employing glass frit, Sparks et al. state the following in column 1, lines 56 to 60:

[B]onding techniques employing glass frit require temperatures typically in the range of about 385° C to 410° C, which can cause polysilicon, electroformed metal and LIGA micromachines to warp, bend and/or become electrically unstable.

Finally, as stated in column 1, lines 64 to 67 of Sparks et al.:

In contrast, solder wafer bonds can be formed at temperatures of 350° C and less, and have been successfully used to form vacuum seals between wafers having a micromachined structure ...

Thus, it is respectfully submitted that Sparks et al. teach away from anodic bonding methods and from heating wafers to a range overlapping a temperature required by the above-mentioned feature of claim 1 as amended, and teach towards solder bonding methods instead. The Office Action apparently ignores Sparks et al.'s teaching away. However, a reference that teaches away from the claimed subject matter is a significant factor to be considered in determining obviousness, and it is improper to combine references where the references teach away from their combination, In re Grasselli, 713 F.2d 731, 743, 218 U.S.P.Q. 769, 779 (Fed. Cir. 1983). Neither Maluf et al., nor Regan et al., nor Applicants' alleged discussion of the prior art cures the critical deficiencies of Sparks et al. with regard to bonding a component structure to a glass layer by anodic bonding at a temperature of approximately 400° C. Accordingly, it is respectfully submitted that the combination of Sparks et al. and Maluf et al. or Regan et al., as well as Applicants' alleged discussion of the prior art, does not render unpatentable claim 1 as amended.

As for claims 4 to 9 and 22, which ultimately depend from claim 1 and therefore include all of the features recited in claim 1, it is respectfully submitted that the combination of Sparks et al. and Maluf et al. or Regan et al., as well as Applicants' alleged discussion of the prior art, does not render unpatentable these dependent claims for at least the same reasons more fully set forth above in support of the patentability of claim 1.

As regards claim 22, Applicants respectfully submit that the combination of Sparks et al. and Maluf et al. or Regan et al., as well as Applicants' alleged discussion of the prior art, does not render unpatentable this claim for at least the following additional reasons. Claim 22 includes the feature that the microstructured component is a yaw rate sensor. Support for this feature may be found, for example, on page 1, line 31 through page 2, line 2 of the Specification. As stated in column 1, lines 60 to 63 of Sparks et al.:

As a further example, yaw sensors with resonating micromachined structures are prone to exhibit zero offset drift, compass effect and start-up drift if subjected to the temperatures necessary to bond wafers with glass frit.

In other words, Sparks et al. teach away from manufacturing a yaw rate sensor, using a wafer bonding technique that employs a temperature range overlapping a temperature required by a feature of claim 22. Accordingly, it is respectfully submitted that the combination of Sparks et al. and Maluf et al. or Regan et al., as well as Applicants' alleged discussion of the prior art, does not render unpatentable claim 22 for these additional reasons.

In view of all of the foregoing, withdrawal of this rejection is respectfully requested.

IV. Conclusion

In view of the foregoing, it is respectfully submitted that the presently pending claims are allowable. It is therefore respectfully requested that the rejections be withdrawn, since they have been obviated. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is respectfully requested.

Respectfully submitted,

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